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mage of *Somateria spectabilis*: Arthur H. Norton; The Summer Molting Plumage of Eider Ducks: Witmer Stone; An Oregon Fish Hawk Colony: Vernon Bailey; The Sequence of Plumages and Molts in Certain Families of North American Birds: Jonathan Dwight, Jr.; The Ranges of *Hylocichla fuscescens* and *Hylocichla f. salicicola*: Reginald Heber Howe, Jr.; On the Occurrence of the Egyptian Goose, (*Chenolopea aegyptiaca*) in North America: Frank C. Kirkwood; Further Remarks on the Relationships of the Grackles of the Subgenus *Quiscalus*: Frank M. Chapman; A Peculiar Sparrow Hawk: William Palmer; The Requirements of a Faunal List: W. E. Clyde Todd; Language of the Birds: Nelson R. Wood; A New Wren from Alaska: Harry C. Oberholser; The Molt of the Flight-Feathers in various Orders of Birds: Witmer Stone; Some Cuban Birds: John W. Daniel, Jr.; On the Orientation of Birds: Captain Gabriel Reynaud, French army.

The next meeting will be held in Cambridge, Mass., commencing November 12, 1900.

JOHN H. SAGE,
Secretary.

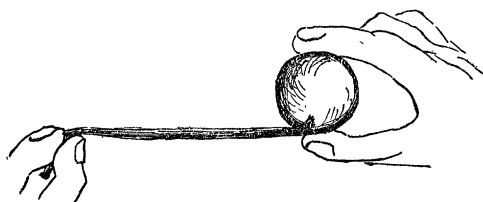
DEMONSTRATING THE CURVE OF THE BASE BALL IN THE LECTURE ROOM.

THE limited space in the lecture room, and the presence of one's audience makes a demonstration of curve pitching difficult even if one has the necessary skill. If the curve is to be made at all apparent in a limited space the ball must be exceedingly light, and the axial rotation very rapid.

I have found the ordinary oak-ball or oak-apple very suitable for this purpose. The rough surface gives the necessary friction, and the ball itself is as light as an egg shell and much stronger.

A strip of rubber band about 15 cms. long and 0.5 cm. wide is wound under tension around the ball (two or three turns are enough), and the ball 'catapulted' forward

by means of the remainder of the band as shown in the figure. The ball will rise,



drop, or curve to one side, according to the position in which it is held. A total deflection of 45° is easily obtained, and when pitching the rise (which is the case shown in the figure) the ball, starting in a horizontal direction, will sometimes ascend half way to the ceiling. This curve is the most striking of course, as the attraction of gravitation is overcome. It shows to the best advantage when thrown directly away from the observer, but this of course is difficult in the lecture hall.

These oak balls are also very suitable for showing the suspension of a ball in an air jet.

R. W. WOOD.

THE ANNUAL REPORT OF THE SECRETARY OF AGRICULTURE.

THE report of the Secretary of Agriculture for 1899, just issued, shows that the Department has had a prosperous year and that the volume of its practical and administrative work has largely increased. At the same time there has been advancement in a number of lines of technical and scientific work.

The extension of the Weather Bureau service around the Caribbean Sea has been abundantly successful in noting the first indications of cyclones and forecasting their movements. Warnings of cold waves have been particularly successful during the past year. A climate and crop service has been successfully established in Cuba and Puerto Rico, and similar work in Alaska has been extended into the interior. The records of

temperature, pressure and humidity, secured at 17 stations where 1200 ascensions of kites were made, have been collated, giving for the first time in the history of meteorology a large number of facts as to the average gradient of temperature up to six or eight thousand feet "free from all injurious influences and for so many days and over such a large region of country that it has a broad significance."

The Division of Chemistry has made important additions to its investigations of soils, including methods of analysis, foods and sugar beets. A special line of work the past year has been the study of preservatives of all kinds which may be used on meats.

The Division of Entomology reports the successful importation of *Blastophaga grossorum* for the fertilization of the flowers of the Smyrna fig trees which are largely grown in California. The study of injurious insects that may invade our territory from contiguous countries has been continued. Investigations are being made regarding the transmission of disease by house flies and mosquitoes. The San José scale, Mexican boll-weevil and insects injurious to growing crops, grasses and tobacco are among the other subjects of investigation in this Division on which considerable progress has been made recently.

The Biological Survey has extended its work on life zones, specially on the Pacific Coast. Several life zones have been run from the bottom of the Sacramento and San Joaquin valleys to the summit of the Sierras. The collection of bird stomachs which this division has accumulated during the past 14 years, numbers 31,300 specimens, about 2000 of which were examined in the laboratory the past year. Considerable work has been done to determine whether birds show marked preferences in selecting food or simply eat what is most abundant.

The Division of Vegetable Physiology and Pathology has been studying diseases affecting timber, the 'little-peach' disease, pear blight, diseases of white and sweet potatoes, a fungus disease attacking sea-island cotton, peach leaf curl, and diseases of lemon, orange and walnut trees. This Division is doing much more work than formerly on the hybridization and breeding of plants, including oranges and other citrus fruits, raisin grapes, corn and wheat. It has also undertaken elaborate investigations in coöperation with the Division of Soils on curing and fermentation of tobacco. "It has been found that the flavor and aroma are due not to bacteria, as was formerly supposed, but to enzymes or oxidizing agents in the leaf itself. The formation of these oxidizing agents and the conditions of their greatest activity are being studied."

The Division of Pomology has continued experiments with a view to the successful production of the finer table grapes of Europe, and has also made investigations in root grafting.

The work of the Division of Forestry has been reorganized during the year. A large amount of practical advice and assistance is being given to farmers, lumbermen and others in handling their forest lands, in a number of different States. The rate of growth of the loblolly pine in North Carolina, and the red or Douglass fir in Washington, has been studied, as well as their special qualities in forestry. Forest fires have been studied historically, and in the field, and the records of more than 5000 fires have been compiled and classified. The Secretary urges that this division be given a largely increased appropriation "to take advantage of the unprecedented opportunities created by the rapid public awakening to the meaning and value of practical forestry."

The Divisions of Soils has considerably extended the investigation and mapping of

the alkali soils of the irrigated districts of the West. Special studies of alkali soils have been made in the Yellowstone Valley in Montana and Pecos Valley in New Mexico, and in the vicinity of Salt Lake City, Utah. Soil surveys of Maryland and of Louisiana have been undertaken in co-operation with local agencies. Investigations of tobacco soils have been extended.

The Division of Agrostology has continued its work on native and cultivated grasses and forage plants with reference to the needs of the arid and semi-arid regions of the West. Studies of plants suitable for binding sands along sea shores and about the Great Lakes have been made in different parts of the country. Several native sand-binders of great promise have been discovered and their utilization, in a practical way, has been undertaken.

The examination of the work of the agricultural experiment stations made by the Office of Experiment Stations shows that these institutions are being more and more appreciated by the farmers and are doing more thorough and satisfactory work.

"The relations of the Department of Agriculture to the experiment stations made by several States become closer every year. An increased amount of assistance is given every year to the State experiment stations to enable them to carry out work of a national character. Coöperative work between the Department and the stations is gradually increasing. The Department is consulted oftener regarding the organization and management of the stations, the choice of officers, the lines of work to be undertaken, the execution of special work, plans for station buildings, materials and apparatus required for use in connection with the different kinds of agricultural investigation, etc."

The need of the establishment of experiment stations in Puerto Rico, Hawaii and the Philippines is strongly urged, and an

appropriation for this purpose is asked for. Satisfactory progress has been made in the establishment of experiment stations in Alaska. The investigations on human nutrition, in charge of this Office, have been continued under the direct supervision of Professor Atwater, with headquarters at Middletown, Conn., and a number of reports have been published. The organization and development of the irrigation investigations, also in charge of this Office, have rapidly proceeded during the past year, and work is now done in this line in fifteen States and Territories. Professor Elwood Mead, formerly State Engineer of Wyoming, has been in charge of this work, and headquarters have been regularly established at Cheyenne, Wyo. This work includes studies of the laws and administrative regulations in the irrigated region and investigations on the supply of water. The need and importance of this work are dwelt upon at considerable length by the Secretary, and its national aspects are pointed out.

The Office of Road Inquiries is working in coöperation with local authorities in building sample roads from the materials found in different localities and in the laying of steel track.

The Section of Foreign Markets has made special studies regarding the trade of the Philippine Islands, Puerto Rico and Cuba, and of Danish imports from the United States. The record for 1898 shows that our agricultural exports were decidedly the largest in the history of the country, their total value reaching over \$850,000,000.

The meat inspection, conducted by the Bureau of Animal Industry, has reached very large proportions. During the past year it was conducted in forty-one cities, and the total number of ante-mortem inspections of animals was 53,223,176. Encouraging results have come from the efforts of the Department to increase the export of

dairy products. The investigations of the Bureau which have resulted in the preparation and distribution of serum for the prevention of hog cholera, swine plague, and blackleg have proved to be very successful. The loss from these diseases has been materially reduced when the treatment recommended by the Department has been followed.

The Division of Statistics has studied the condition of the agricultural industry of the country "as indicated by the area of land devoted to the cultivation of the principal products of the soil; the actual volume of production and the value of particular crops, both on the farm and in the principal markets; the cost of production per acre and per unit of quantity and the cost of transportation; the number and value of farm animals and the losses annually resulting from disease and exposure; the volume, condition and prospects, according to the season of the year, of such of the crops of foreign countries as compete with those of the United States in the world's markets."

The Secretary reviews at some length the subject of seed distribution. He warmly defends such distribution in so far as it adheres to the original intention of Congress, which was to search for and gather in various localities of the Old World useful seeds and plants to be distributed in the United States to the several regions where they would be most likely to succeed. The Department is at present endeavoring to bring back the practice as much as possible to this original intention, a larger per cent. of the \$130,000 appropriated being now spent in securing, importing and distributing rare and useful seeds and plants.

The tea growing experiments in South Carolina are commended and their intelligent prosecution advocated. The interesting fact is noted that the tea gardens at Summerville produced 3,600 pounds of tea the past season. Irrigation experiments,

improvement of varieties by importation and by hybridization, are indicated as important steps to be studied.

In regard to public lands, the Secretary deplors the ill results of injudicious grazing due to the indifference of the occupiers under the present system. He advocates leasing in large areas and for a sufficient time to invite improvement, and suggests that the revenue from such leases might be turned over to the States for educational purposes or irrigation.

The Secretary concludes his report with important recommendations on a variety of subjects.

Of the abandoned farms of New England he says that they are not abandoned on account of sterility; that they will be studied by the soil physicist, agrostologist, and the forester, and the valuable suggestions resulting from their studies will be distributed throughout New England.

He urges that means be adopted to produce in Puerto Rico, Hawaii and the Philippines many of the tropical plants which this country now imports to the extent of \$200,000,000 annually—more than four times as much as the total exports of the islands in question.

Our import of oranges, lemons, coconuts, bananas, and especially coffee, of which in 1898 we imported over \$65,000,000 worth, could, in large part, be produced in Puerto Rico. The Secretary especially recommends experiments in the production of india rubber, for which we are now largely dependent upon Brazil. The import of india rubber and gutta-percha in 1898 exceeded in value \$26,000,000, of which three-fifths came from Brazil. After discussing at some length the methods of collection and treatment and the character of the Brazilian product, he indicates one tree in particular, known as the Ceara, as likely to be the first to produce an important addition to the natural supply of

india rubber. He adds: "The feasibility of cultivating this plant in the Philippines should be very carefully investigated."

The Turkestan alfalfa introduced by the Department is warmly commended as successfully withstanding drought and cold. It is proposed to distribute it widely over the arid West, to be thoroughly tested, and its introduction is spoken of as likely to add millions of dollars to the annual hay product of the country.

A valuable rice has also been introduced from Japan. It possesses a high milling quality and is highly superior to the domestic product, and should it succeed in Louisiana, hundreds of thousands of dollars will be added yearly to the rice-growing industry.

In connection with the subject of native drug plants, coöperative work is proposed by the Department and the Pan-American Congress in a technical and scientific investigation of these plants; \$10,000 is asked for to enable the Department to undertake this work. The great increase of cotton imports from Egypt, averaging in value for the past three years nearly $3\frac{3}{4}$ million dollars, lends importance to the experiments so far made with the Egyptian cotton seed imported by the Department in 1894. While a further trial is needed, hope is expressed, that with proper management, it will become well established in the United States.

Mr. Wilson makes a most urgent plea for the erection on the Department grounds of new laboratory buildings as a substitute for the numerous and inconvenient buildings, mostly dwelling houses, now occupied for laboratory purposes at a cost of \$10,000 a year. He has caused plans to be prepared of fireproof structures providing an increase of floor space over the present accommodations and in every way more suitable and economical, to cost, approximately, \$200,000.

The concluding portion of the report is

devoted to a discussion of agricultural education. The Secretary holds that in view of the importance of agriculture in the economic life of the country, adequate measures for the efficient agricultural education of our people, nearly one-half of whom are engaged in agriculture, are lacking. He refers to the impossibility of securing, on demand from the Civil Service Commission, persons qualified to serve as assistants in the scientific Divisions of the Department. The training of the necessary experts has to be done in the Department itself, and then when their full measure of usefulness is attained, wealthy institutions take them from the service by offering much higher salaries than the Department is authorized to pay.

Arrangements have been made with the Civil Service Commission to make a register of the graduates of the land-grant colleges. From this register young men will be selected to assist in the scientific divisions at very small pay, but with special opportunities for post-graduate study such as no university in the land supplies. By this means it is hoped that the Department will have a force from which not only to fill vacancies when wealthy institutions take away the Department's trained men, but possibly, also, to supply agricultural stations and other scientific institutions with men of superior scientific attainments. This is a step intended to complete the educational system provided in the endowment of agricultural experiment stations and agricultural colleges. The work so proposed will entail but moderate expense, and the Secretary expresses the hope that it will meet with the approval of Congress. Reference is made to the gratifying evidence of growing interest in the subject of elementary instruction in sciences relating to agriculture, and to the progress made in this regard since the Secretary presented his last Annual Report.

During the year the Department issued

603 publications, aggregating 26,240 pages. The total number of copies was over 7,000,000; 4,000 volumes were added to the Department library.

SCIENTIFIC BOOKS.

Die Landbauzonen der aussertropischen Länder.

By TH. H. ENGELBRECHT. Three volumes. Berlin, Dietrich Reimer (Ernst Vohsen). 1898. Royal 8vo.

These stately volumes were prompted, as the author's preface states, primarily by the question of American competition with European production; certainly a most timely topic. Vol. I., of 290 pages, contains the explanatory text for the other two, of which one consists of statistical tables of production, while Vol. III is an atlas of 79 colored maps, the graphic representation of results of comparisons made upon a basis somewhat different from the usual ones of total, or cultivated areas, or population. The author's object is to elicit the peculiar tendencies of agricultural production rather than its absolute quantities, and by the discussion of the causes of these tendencies to forecast present and future possibilities. He objects to the method of computation of the 'importance' of the several crops devised by Walker (amount produced divided by area population) as affording no definite clew to any inquiry as to causes.

Adopting for the extra-tropical countries the cereal grains as the fundamentally important product, Engelbrecht compares with the total area occupied by these, both those occupied by each individual kind, and by other crops. Correspondingly, in treating of the animal industries, he assumes neat cattle as the basis of comparison with other domestic animals. On the maps these comparisons are made by means of five, or at times six, shades of color, to which are frequently added important (mostly monthly) isotherms, as well as colored limiting-lines of the occurrence of important trees, of excess of production of one product over another, of limited special cultures, etc., whereby the comparisons are greatly facilitated and many interesting points are brought out. Thus, in Russia, the marked coincidence of the northern

limit of the oak forest and of wheat culture is shown; in the United States, the limits between predominance of summer and winter wheat, of rice over wheat culture, etc.

For the Old World, where changes are very slow, the latest census has, as a rule, been utilized, and as there no uniformity of dates exist among the various states, the data represented are frequently of different dates. From the cause just mentioned these discrepancies are of minor importance; yet in the more progressive countries the establishment of new trade routes and connections following lines of railroads and steamships has even in Europe, in many instances, been followed by rapid changes in lines of production. In the case of the United States, with the rapid changes both in population and routes of communication, the comparison or several successive enumerations is given by means of tables.

In the Old World the maps are made to extend to the Ural mountains on the east, and southward so as to embrace Algeria and Tunisia. In America the map colors for the cereals reach a short distance only into Canada; for other products the Dominion is left in blank, although quite fully represented in the tables of Vol. II. In South America the Argentine Republic is included in the graphic presentation, as are, in Australia, the temperate culture belts of the east and west coasts. Cape Colony is also considered in the matter of animal industry.

In the United States the smallest units considered are the single States. In Europe the smaller administrative units—departments in France, 'governments' in Russia, in England, counties, are separately colored on the maps and listed in the tables; the results of several census periods are frequently given, both in tables and maps, and numerous minor cultures are included in detail.

Accustomed as we are to interpret intensity of coloration in statistical maps as a measure of absolute production, at first sight these maps strike one rather oddly. Thus when Ireland and western Lapland bear the same color in respect to the production of the potato, and Nevada and Arizona appear most intensely colored on the score of the production of barley, our geographical and economic consciousness 'is